



King's Research Portal

DOI:

[10.1111/eje.12292](https://doi.org/10.1111/eje.12292)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Faulks, D., Dougall, A., Ting, G., Ari, T., Nunn, J., Friedman, C., John, J., Daly, B., Roger-Leroi, V., & Newton, J. T. (2018). Development of a battery of tests to measure attitudes and intended behaviours of dental students towards people with disability or those in marginalised groups. *European Journal of Dental Education*, 22(2), e278-e290. <https://doi.org/10.1111/eje.12292>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Development of a battery of tests to measure attitudes and intended behaviours of dental students towards people with disability or those in marginalised groups.

Developing measures of dental students' attitudes and behavioural intentions concerning treatment for patients with special health care needs and/or from marginalised groups: a pilot study

ABSTRACT

Introduction: Recommended curricula in Special Care Dentistry outline learning objectives that include the domain of attitudes and behaviours but these are notoriously difficult to measure. The aims of this study were i) to develop a test battery comprising adapted and new scales to evaluate values, attitudes and intentions of dental students towards people with disability and people from marginalised groups and ii) to pilot the test battery to determine reliability (inter-item consistency) and validity of the scales within the test battery for factor analysis.

Materials and Methods: A literature search identified pre-existing measures and models for the assessment of attitudes in healthcare students. Adaptation of three pre-existing scales was undertaken and a new scale was developed based upon the Theory of Planned Behaviour (TPB) using an elicitation survey. These scales underwent a process of content validation. The three adapted scales and the TPB scale were piloted by 130 students at 5 different professional stages, from 4 different countries.

Results: The scales were adjusted to ensure good internal reliability, variance, distribution, and face and content validity. In addition, the different scales showed good divergent validity.

Discussion: These results are positive and the scales now need to be validated in the field. for cultural adaptation and temporal stability.

Conclusions: It is hoped that these tools will be useful to educators in SCD to evaluate the impact of teaching and clinical exposure on their students.

BACKGROUND

One of the barriers to healthcare for people with disability and for those in marginalised groups is the attitudes of healthcare personnel [1] (~~See definitions in Table 1.~~). Health professionals may lack confidence due to a lack of knowledge and skills, and may feel uncomfortable because they lack experience of human diversity [2]. There have been calls to improve the teaching and learning experience of health professionals with regards to both people with disability and those in marginalised groups [3-10]. Education and training may improve healthcare students' attitudes but evidence of this effect is limited by the quality of research available and in particular by problems of valid measurement [11,12]. The ~~conceptualisation~~ **assessment** of student attitudes and behaviour towards underserved populations therefore requires empirical attention, both in terms of establishing measures, and in identifying maximally effective interventions to develop and improve appropriate attitudes and behaviours [12].

Dental care is particularly important within this context as it is a service that is universally required and organised around a local primary dental care provider, who is responsible for the majority of care. It is essential that this local practitioner be confident and competent for the management of patients with disability and from marginalised groups, if inequalities in oral **health and disparities in access to oral healthcare services should be reduced**. The International Association of Disability and Oral Health (iADH) recently undertook an international consensus process to establish an 'Undergraduate Curriculum in Special Care Dentistry', with learning outcomes that cover the areas of knowledge, skills, and attitudes and behaviours required by a qualifying dentist. **The iADH defines Special Care Dentistry (SCD) in this document as "Dentistry for individuals with a disability or activity restriction that directly or indirectly affects their oral health, within the personal and environmental context of the individual. Depending on service structure, people**

requiring special care may also include persons living in a social, cultural or environmental context that directly or indirectly affects their oral health, in relation to the social determinants of health and to barriers experienced in accessing health care and prevention. i.e. depending on local environmental context (service structure), this population may include patients of all ages, medically compromised patients, prison populations, recent immigrants or refugees, homeless persons, persons with dental fear or phobia, travellers etc.” ~~This~~ The process of curriculum development was reported in the European Journal of Dental Education [13-15] and the learning outcomes were mapped to the ADEE ‘Profile and competencies for the graduating European dentist’ document [16]. Feedback from this process suggested that educators are confident when teaching and assessing knowledge but that it is difficult to evaluate whether their teaching has an impact on attitudes or behaviour.

The iADH set up a taskforce at the Association for Dental Education in Europe (ADEE) annual meeting in Birmingham, UK in 2013 to develop and validate a battery of tests to evaluate values, attitudes and behaviours within Special Care Dentistry (SCD). The iADH taskforce defines people with disability as “People whom experience the negative aspects of the interaction between their environmental and personal context and any functional impairments, activity limitations and participation restrictions that they may present”, in line with the WHO’s Classification of Functioning, disability and health (ICF ref). People from marginalised groups are defined by the iADH group as “Groups of individuals relegated to an unimportant or powerless position within society due to low economic status, low social status, immigration, disability, health issues, incarceration, race, religion, sexuality, non-conformist beliefs, age and dependency, and other factors of social exclusion.” ~~(definition given in Table 1).~~ The development and piloting of the test battery are presented here, with the specific aims being:

1. to develop a test battery comprising adapted and new scales to evaluate values, attitudes and intentions of dental students towards people with disability and people from marginalised groups
2. to determine reliability (inter-item consistency) and validity of the scales within the test battery.

METHODS

PHASE 1: Instrument Development and Content Validity Testing.

Conceptual framework

Concepts understood by the development team to be central to dental student attitudes towards people with disability and marginalised groups were identified. These included integrity, defined as “the quality of being honest and of adhering to strong moral principles” and recognised as a pre-requisite for professionalism in the healthcare field [17]. Another pre-requisite for medical professionalism is altruism, which may be defined as “the principle or practice of unselfish concern for the welfare of others”. In terms of SCD this was deemed to include the belief in healthcare as a universal human right. In addition, perceptions of professional duty and awareness of the barriers to healthcare were believed to form attitudes.

In terms of measuring intended behaviour towards people with disability and marginalised groups, the Theory of Planned Behaviour (TPB) [18] was identified as the most appropriate theoretical model. The elements of the Theory of Planned Behaviour are shown in Figure 1. This theory is intended to explain behaviour over which people have the ability to exert self-control, such as professional behaviour. It assumes that behavioural intentions are influenced by attitude about the likelihood that the behaviour will have the expected outcome and the subjective evaluation of the risks and benefits of the outcome. TPB has been used extensively in health-related fields and has been shown to perform well within this context

[19,20]. Intention simulation using clinical scenarios may provide a valid proxy measure for actual behaviour in ‘real’ clinical situations, although it is acknowledged that intention does not always translate into action. As a psychological theory of behaviour, the main limitations of TPB (as with other psychological models of behaviour) are that it overlooks environmental and financial influences on behaviour, that influence of knowledge on attitudes is not taken into account, and that it places too high an emphasis on cognitive rather than affective attitudes [20].

Identification of pre-existing scales

A PubMed search was undertaken using the search term “healthcare students” combined (AND) in turn with: “attitudes AND disability”; “attitudes AND marginalised groups”; “attitudes AND underserved populations”; “civic responsibility”; “integrity”; “altruism”; “professionalism”; “empathy” and “clinical aptitude”. Full text articles were accessed, or abstracts if unavailable, and any relevant references in each of these articles that had not already been identified were also sought. ~~Overall 287 articles were identified as relevant. Of these, 64 gave descriptions of tools to evaluate values, attitudes, intentions or behaviours for healthcare students or personnel, a further 94 gave results of studies using pre-existing measures and 4 were literature reviews.~~ These initial articles and documents were examined by two researchers and those scales that best fit the conceptual framework were retained after discussion with the Taskforce group. These included a measure of integrity developed and validated by Whitely at the Essex Centre for the Study of Integrity (2012) [21]. A measure of altruism was also retained. This scale was developed as a small part of a national survey by the American Dental Education Association [22] and validated by Carreon et al [23] who reported good reliability (Cronbach’s alpha = 0.83). The ‘Disability Attitudes in Health Care’ (DAHC) scale was also retained and had been validated for reliability by the original authors (Cronbach’s alpha = 0.74) [24]. No scale using the TPB model was identified in the context of attitudes of healthcare students or personnel.

Development of a battery of adapted and new scales (Draft 1).

The first draft of the battery comprised 4 scales.

- 1) Scale 1 was designed to evaluate the integrity of the respondents. This scale comprised a modified version of Whitely's Integrity test [21]. The 10 original items were retained and 3 items were added '*Claiming benefits to which you are not entitled (grants, reductions...)*'; '*Cheating in university or professional exams*' and '*Not using your right to vote*'. Response options were 'Never justified'; 'Rarely justified'; 'Sometimes justified' or 'Always justified'.
- 2) Scale 2 was comprised 6 items adapted from Carreon et al [23] and 4 items adapted from the DAHC scale [24]. The adaptation was to ensure the specificity of the items with regards SCD, for example '*Assuring and providing care to all segments of society is an ethical and professional obligation*' became 2 items: '*Assuring ... care for persons with disability is an ...obligation*' and '*Assuring ... care for persons in marginalised groups is an ...obligation*'. Response options were 'Strongly disagree'; 'Disagree'; 'Agree' or 'Strongly agree'.
- 3) Scale 3 was designed to assess whether students perceive barriers to the treatment of people requiring SCD. It consisted of 13 items overall - 11 items adapted for SCD from the DAHC scale [24] and 2 additional items relating to SCD '*Patients with disability should always be treated by specialist practitioners*'; and '*Patients from marginalised groups should always be treated by specialist practitioners*'. Response options were 'Strongly disagree'; 'Disagree'; 'Agree' or 'Strongly agree'.
- 4) Scale 4 was designed using the core concepts of the Theory of Planned Behaviour (TPB) (Figure 1). The scale was developed by the authors following published guidelines [25]. Twelve SCD case-based scenarios were developed and it was intended that educators should choose the scenario most suited to their teaching context. The scenarios involved a

similar presenting complaint for each of the following contexts: a patient with physical disability; a patient with intellectual disability; a patient with a psychiatric disorder; a patient with a complex medical history; an elderly patient who was housebound; a patient with HIV infection; a patient with drug dependency; a recent immigrant who does not speak your language; a patient with low income and only basic health coverage; a patient who was homeless; a patient with severe dental anxiety; a patient with a sensory disability. For example, the scenario for a patient with physical disability was: *‘Just as the surgery opens, you receive a phone call asking for an emergency appointment. The patient has constant throbbing pain in an upper front tooth that has kept the patient awake all night despite regular use of analgesics. The patient reports that she has hemiplegia on the right side and uses an electric wheelchair.’*

This TPB scale covered the following domains: i) simulated intention, ii) behavioural beliefs, behaviour outcome beliefs and evaluation of behaviour outcomes; iii) subjective norms, normative beliefs and motivation to comply; and iv) control beliefs, perceived behavioural control and influence of control beliefs.

An elicitation study was undertaken to develop the items in each of the domains [25]. This involved a convenience sample of 18 dentists from 12 countries attending a SCD Special Interest Group meeting at the 2013 ADEE conference. The aim of the elicitation study was to identify a list of modal accessible beliefs i.e. a list of the most commonly held beliefs by dentists with regards treating patients with disability or from marginalised groups. The participants completed a written questionnaire (Appendix 2) and then discussed their answers with others in the group and with the researcher.

The resulting TPB scale consisted of 12 sections with 56 individual items overall. 3 questions had Yes / No answers and the others had a 7 point bipolar adjective scale (e.g. *‘Not at all difficult – Extremely difficult’*).

The scales in the battery were designed to be completed anonymously and were therefore not intended for the assessment of individual students, but rather for the evaluation of the impact of teaching on groups of students. For example, the scales may be used to gather baseline data, to compare groups with or without teaching, groups before and after teaching, or groups of different types of students. The use of identifiers in order to follow individual students would potentially compromise ~~both real and perceived~~ anonymity, leading to a ~~huge~~ potential for bias. [This difficulty might be overcome by randomly assigning an identifier on the pre- and post- tests, for example, but there is a risk that students would still perceive this process as a breach of anonymity.](#)

Demographic data were also to be collected and an initial draft of the demographic data form was produced at this stage. This form was to be completed by all students prior to completion of any of the scales. Information was designed to be anonymous. Items were derived from variables suggested as important by the literature [7-11;23,24,26]. Items included: sex, year of birth, geographical family background (rural, urban etc); socioprofessional status of mother and father; principal source of finance during studies; lived environment whilst a student; direct personal experience or experience of working with, or socialising with, people with disability or from marginalised groups; and membership of charitable or community organisations; stage in dental training or years of experience in practice. Formal definitions of ‘Persons with disability’ and ‘Marginalised groups’ were also given ~~(Table 1)~~.

Content validation by expert group and redraft (Draft 2)

A consensus meeting was held involving 9 experienced educators in SCD from 7 countries. The aim of this meeting was to seek agreement on any items that were unnecessary, redundant or irrelevant, to correct those items that were poorly worded, and to add any concepts that might be missing. Changes were made that seemed relevant to the group within the context

of assessing dentists and dental students. Each scale, and each item, was scored for relevance from 1 to 7 by all participants with anchors of 1=Not at all relevant to 7=Extremely relevant, and retained if the average score was 5 or over. Any changes in wording or new items were also voted upon by the group and all items of the demographic data form were analysed in the same way.

The decisions made during the content validation process were assimilated into a second draft of the battery. In all cases, the term ‘persons’ was changed to ‘people’ with disability and ‘people’ in marginalised groups. Scale 1 (Integrity) was reduced to 12 items and one item was changed. Scale 2 (Altruism) went from 10 to 11 items with one addition. Scale 3 (Barriers) retained 13 items with minor changes to wording.

Scale 4 (TPB) was substantially changed following initial content validation in order to provide examples that were clinically accessible to inexperienced students. The scenarios were considerably simplified and the presenting complaint was changed from ‘constant throbbing pain in an upper front tooth’ to ‘lost a restoration in an upper front tooth’. For example, the scenario involving a patient with physical disability became ‘*You receive a phone call from a patient who has lost a restoration in an upper front tooth. The patient reports that she has hemiplegia on the right side and uses an electric wheelchair.*’ Similarly, in the section relating to intention simulation, the item ‘*Would you provide care for this patient?*’ was changed to ‘*Assuming that the treatment required was within your clinical competence, would you provide care for this patient?*’.

In the section relating to behavioural beliefs, the wording of 3 of the 5 items was changed and the order of the items was altered. In the sections assessing behaviour outcome beliefs and evaluation of behaviour outcomes, the wording was changed from positive to negative for three items and one item was re-worded. In addition, 2 items were added. In the sections relating to subjective norms, normative beliefs and motivation to comply, 3 out of the

5 items were retained and four items were added. In the section on control beliefs, one item was added to the four pre-existing items and in the section relating to perceived behavioural control, one item was removed.

PHASE 2: Pilot testing and Factor analysis (draft 3).

Scales 1 to 4 and the demographic data form were piloted in an online survey. Following ethical approval in each country, undergraduate, postgraduate and continuing professional education students were recruited in Canada, England, Ireland and Malaysia. An international sample was recruited to ensure that the wording and concepts were tested by students that spoke both British and North American English, and by students whose first language was not English. The sampling sought to identify a range of individuals who would be expected to differ in regard to their attitudes towards and experience of working with individuals with disability and/or marginalised groups. Respondents were recruited, directly or indirectly, by members of staff at their place of work or study, and were drawn from the following groups:

- Pre-clinical undergraduate dental students (prior to any patient contact)
- Clinical undergraduate dental students (during clinical training)
- Newly qualified dental practitioners (<4 years experience)
- Experienced dental practitioners (>4 years experience)
- Dental postgraduates (dentists enrolled on a postgraduate course)

The sample size aimed at 100 participants, based on guidance on the number of participants required for a pilot study [27]. All participants were invited to log on to a SurveyMonkey® link if they wished to participate. They were informed that the survey was anonymous, was unrelated to any course they were taking, and was designed to assess the feasibility of each scale. All scales were preceded by an explanation that no item had a right or wrong answer, and that it was the personal opinion of the student that mattered. In order to test

face validity and content, respondents were asked to give comments regarding wording, comprehension, structure and time for completion after each section.

Analysis was undertaken using SPSS v19.0 for Macintosh. For each of the scales, the frequency of responses to each item was described. Items were to be removed if there were significant floor or ceiling effects (defined as more than 90% of responses being in a single response category). For each scale an overall score was also calculated for each respondent:

- Scale 1 (Integrity): the 12 replies were added, with 'Never justified' = 1 and 'Always justified' = 4 (range 12 to 48 with a lower score being more favourable).
- Scale 2 (Altruism): the 11 replies were added, with Strongly disagree = 1 and Strongly agree = 4 for items 1 to 6 and 11; and Strongly disagree = 4 and Strongly agree = 1 for items 7 to 10 (range 44 to 11, with a higher score being more favourable).
- Scale 3 (Barriers): the 13 replies were added, with Strongly disagree = 4 and Strongly agree = 1 for items 1 to 8 and 11 to 13; and Strongly disagree = 1 and Strongly agree = 4 for items 9 & 10 (range 52 to 13, with a higher score being more favourable).
- Scale 4 (TPB): the sections were scored independently. The first section was dichotomous (yes/no); the second section scored difficulty from 1 to 7; for the remaining sections the 7 point Likert scale was coded on a scale from -3 to +3 with a midpoint of zero (a higher score being more favourable).

Internal consistency was tested using the Cronbach's alpha for each scale as well as item-total correlations ($\alpha > 0.7$ was considered acceptable; $\alpha > 0.8$ good; and $\alpha > 0.9$ excellent). Individual items with an item-total correlation below 0.3 were removed. The alpha for the scale if items were removed was also calculated. Finally, a principal components factor analysis with varimax rotation was conducted for each scale to determine the factorial validity of the scale. Eigenvalues greater than 1.0 were used to define scale factors, and interpretation of the scale

was agreed among two authors. Significant differences between student groups was sought for each scale using oneway analysis of variance. Construct validity was investigated within Scale 4 (TPB) by comparing constructs using one way ANOVA. Divergent validity between scales was analysed using Pearson correlation coefficients.

RESULTS OF PILOT STUDY

Overall, 130 students completed Scale 1 of the pilot study, 127 completed Scale 2, 122 completed Scale 3, 121 completed the first section of Scale 4. The clinical scenario-related section of Scale 4 was not presented to the preclinical undergraduates (n=42), as they had no clinical experience. 79 of the 88 respondents eligible to complete this section did so. There was slight attrition in number of respondents for each scale, presumably due to response fatigue. The distribution of the respondents is given in Table 1.

Factor analysis

Table 2 shows the frequency of responses to the items that formed Scale 1 (Integrity). For the 130 respondents, the mean score was 17.95 ± 5.39 (range 12 to 46). There were two items where over 90% of responses fell into one response category (items 7 and 10 - '*Throwing away litter in a public place*' and '*Claiming benefits to which you are not entitled*'). A principal components factor analysis with varimax rotation was performed for the 12 items. The Cronbach's alpha for the full scale was 0.86. Two subscales emerged explaining a total of 56.5% of the variance. Table 2 also summarises the properties of the scales formed by factor analysis. The two subscales were retained but the total scale should also be reported as they all have good internal consistency. There were no significant differences between student groups on this scale using oneway analysis of variance.

For the 127 respondents completing Scale 2 (Altruism), the mean score was 36.54 ± 4.76 with a range of 44 to 19. Table 4 shows the frequency of responses to the items of Scale 2. There were no items where over 90% of responses fell into one response category. A principal components factor analysis with varimax rotation was performed for the 11 items. Three subscales emerged explaining a total of 67.9% of the variance. Table 4 also summarises the properties of the subscales formed by factor analysis. Two of the factors were found to be single item subscales and were therefore omitted from the final draft (items 2 and 11). The Cronbach's alpha for the scale omitting items 2 and 11 (9 items) was 0.86. There were no significant differences between student groups on this scale (oneway analysis of variance).

For the 122 respondents completing Scale 3 (Barriers), the mean score was 39.53 ± 4.71 with a range of 52 to 27. Table 4 shows the frequency of responses to the items of Scale 3. There were no items where over 90% of responses fell into one response category. A principal components factor analysis with varimax rotation was performed for the 13 items. Five subscales emerged explaining a total of 76.1% of the variance. Table 4 also summarises the properties of the subscales formed by factor analysis. Table 5 compares the mean values of the subscales and total scale for the student groups using oneway analysis of variance. For the time and resources factor, newly qualified dentists were more likely to consider that people with disability and from disadvantaged groups use too many resources including time, when compared to pre-clinical undergraduates. For the training factor, postgraduates were more likely to perceive a need for training in this area, in comparison to newly qualified dentists. Varimax rotation is used when independent factors are assumed. It tends to produce a single general factor and additional factors that represent dichotomies, which appears to be the case in this instance. For the final draft, the total score for this scale was therefore abandoned and the subscales used instead.

Scale 4 (Theory of Planned Behaviour). The first section in this domain is non-scenario specific and consists of two items as shown in Table 6. There was a very high rate of intention to treat patients from disabled and marginalised groups amongst the respondents (96% and 92% respectively).

Seventy-nine respondents completed Scale 4 with respect to the scenario of a patient with a physical disability. In the section on intention simulation, 99% of respondents reported being willing to treat the patient, with 86% having little difficulty in making this decision (score of 1 to 3).

For the section that sought to explore behavioural beliefs all 5 items were found to be skewed (Table 7). The overall Cronbach's alpha for the scale formed from the five items was 0.47, which is unacceptably low. It was decided to exclude these items from the final draft. For the section regarding behaviour outcome beliefs (Table 8) Cronbach's alpha for the entire scale was 0.73, but this increased to $\alpha=0.86$ if items 4 and 6 were removed (both had low item-total correlations). These items were therefore removed for the final draft. For the section on evaluation of behaviour outcomes (Table 8), Cronbach's alpha for the entire scale was 0.61, but this increased to 0.81 if items 4 and 6 were removed (both had low item-total correlations). These items were therefore removed as above.

The sections regarding subjective norms and normative beliefs were combined for analysis (14 items) (Table 9). Cronbach's alpha for this scale was 0.94 and this section was therefore retained in the full 14 item form. The section regarding motivation to comply consisted of 7 items (Table 10). It showed a high level of internal consistency with a Cronbach's alpha of 0.90. It was retained without alteration.

The section relating to control beliefs consisted of 5 items (Table 11). One item (*'It would be easy for me to treat this patient'*) was reverse scored for this scale. The overall Cronbach's alpha for the five item scale was 0.73 and all items were retained. A total of 9 items

were combined to assess perceived behavioural control and the influence of control beliefs (Table 11). Cronbach's alpha for this total scale (9 items) was 0.57. However, by only including items 5 to 9 the value of alpha rose to 0.74. Thus the first four items were excluded from the final draft.

The replies of the four student groups completing Scale 4 were analysed using one way ANOVA to compare the constructs within the TPB scale (Table 12). Significant differences between groups provide some evidence of construct validity since it would be anticipated that experienced practitioners should differ from clinical undergraduates in their perceptions of control, social norms and to an extent their behavioural beliefs. However the significance of the F value should be considered with caution for the variables 'Influence of control beliefs', 'Social norms – motivation to comply', 'Social norms – beliefs' and 'Behavioural beliefs' since the post hoc Tukey B test did not identify any differences between the student groups. In addition the numbers in each group were disparate.

Divergent validity between scales.

The simple correlations between the TPB constructs (Scale 4) and the 3 other scales are shown in Table 13. There is little correlation between the different measures (with the possible exception of the first section of Scale 3 which correlates with most TPB constructs). This is good evidence of divergent validity – the domains appear to be measuring different aspects of thoughts and beliefs about working with people with disability or those in marginalised groups.

Face validity, comprehension and utility - views of respondents to pilot survey

Only one change was made to the scales based on the respondents' comments. For Scale 4, in the section regarding behavioural beliefs, 23 out of 79 respondents commented that the use of the words '*Extremely undesirable*' and '*Extremely desirable*' at the ends of the scale was inappropriate. In response to this feedback, the wording was changed to '*Extremely*

unimportant’ and *Extremely important*’. No other problems with the wording of any of the scale items were identified by more than two respondents.

More general comments were made by 8 of 79 respondents regarding the repetitiveness of the items in Scale 4, which might lead to response fatigue. Five out of 130 respondents reported having difficulty with the definitions of people with disability and those from marginalised groups, either in understanding or in differentiating the two. Six respondents suggested that their attitude would “depend on the circumstances”, three of whom would have preferred situational descriptions for Scales 1 and 3. Three comments were made as to the utility of the scales for self-reflection purposes. All other general comments involved discussion of why respondents had given certain answers or justifying certain choices.

The full battery of tests following piloting is given in full in Appendix 1.

DISCUSSION

This article describes the development and preliminary validation of a battery of tests to assess different aspects of student values, attitudes, intentions and behaviours with regards to people with disability and those from marginalised groups. It is hoped that these tools will be useful to educators in SCD to evaluate the impact of teaching and clinical exposure on their students. The choice of tool, or of scenario for Scale 4, is left to the educator in relation to the learning objectives for each course. ~~It is intended that other scales may progressively be added to the test battery once validated in the context of special care dentistry.~~

In Scale 1, the value of integrity is investigated. The scale upon which this domain was based [21], relates to cheating and rule-breaking in daily life, rather than high-level dishonesty or crime. This scale was designed in the UK and has a strong cultural bias. It is likely that some

of the items would need to be removed or altered for different cultural contexts, for example, *‘Driving under the influence of alcohol’* would not be appropriate in predominantly Muslim countries. It is also likely that different results will be found between different age groups and countries, although this is not a problem if used to measure internal change rather than comparing disparate groups. Scale 2 was developed to investigate altruism and attitudes to healthcare as a right. It included certain items relating to altruism from a survey of 3481 dental students in the USA [22,23]. This large US survey found that an altruistic attitude correlated with being female, from an ethnic minority, and from a low socioeconomic background, although this ‘snapshot’ survey did not look at the influence of teaching. Scale 3 was designed to assess whether students perceive barriers to the treatment of people requiring SCD with items adapted from the DAHC [24]. The DAHC study specifically defined disability as an impairment in physical function, but the definition in the current context was much wider. It is recognised that barriers to healthcare are socially constructed and self-perpetuating. Changing student awareness of the nature of such barriers may be an important step to changing attitudes and it is hoped that this tool might help to investigate the validity of this hypothesis. Other studies using the DAHC have shown a link between positive attitudes and female gender, stage of medical education and personal experience of working or socialising with people with disability [24]. In terms of a wide definition of persons requiring special care dentistry, it was important to include items relating to both persons with disability and those in marginalised groups. It may be that educators will use these results to change the emphasis given to one or more groups in their special care teaching module and to ensure that attention is paid to a full range of groups over the span of a curriculum.

During piloting of the Theory of Planned Behaviour scale it was not possible to test all the scenarios due to the sheer volume of items involved for the respondents. The case study of a patient with physical disability was chosen as it thought to be the easiest for inexperienced

students to perceive. It is likely however that greater variation on analysis would have been found with a more complex scenario, particularly with regards to the section on behavioural beliefs section. In addition, it would have been interesting to compare answers to the first section of the TPB scale concerning willingness to treat between different scenarios, as this would have possibly had an effect on variance. In terms of future usage, educators will be able to choose the scenario most suited to their immediate needs. They might also be able to use the same scale with scenarios of their own devising, provided they remain within the clinical competence of the respondent. The results of the TPB scale could be used to identify those areas that most affect a student's intentions and therefore allow teaching interventions to be designed to address these issues directly. From the pilot results presented here, it would seem that particular attention might need to be drawn to the issue of beliefs regarding the outcomes of providing treatment and to perceptions of control. The scale will need further validation with the full set of scenarios and a larger number of participants, however, before any conclusions may be drawn. In addition, testing for temporal stability (test-retest) will be required in those situations where temporal stability will be important such as exploring the relationship between TPB constructs and behaviour. Given also the pedagogical goals of the overarching project, the scales will not only need to demonstrate temporal stability in those situations where no change in constructs would be expected over time, but in addition be able to demonstrate sufficient sensitivity to change in order to be able to detect differences in the construct over time within individuals occurring as the result of education and/or experiential learning.

Self-report measures of attitudes or values are flawed by subjective report. It is of course impossible to know if the student is replying truthfully or whether they are giving responses they think will please the investigator (social desirability bias) or on the contrary, whether they are playing devil's advocate (norm defiance). These effects can be reduced by reassuring the respondent of truly anonymous data collection (using a secure internet portal rather than face-

to-face, for example) and by explaining that data are to be pooled to assess a group not an individual. Other problems include acquiescence bias, where certain respondents will tend to agree with all statements across the board. This effect can be reduced by including both positive and negative statements regarding each issue in the scale. It is also likely that certain students know the ‘right’ answer, but that this knowledge is not translated into behaviour [28]. Despite these reservations regarding self-report measures, the only reliable way of inferring attitudes is to assess actual behaviour (directly or by video). In comparison, questionnaires are easy to implement and permit comparison between groups and over time. It would seem, therefore, that a well-designed scale is a useful tool, but should be combined with other methods of assessment [29]. While the analyses presented here suggest that some differences exist between groups defined by their status as practitioners, caution should be exercised in drawing conclusions based on the current samples, particular for the newly qualified group which was very small.

CONCLUSIONS

Overall, the results of the pilot study enabled the development of a battery of tests with good internal reliability, variance, distribution, as well as face and content validity. In addition, the different domains were shown to have divergent validity. Although these results are positive, the scales now need to be tested in the field. For this purpose, a call for collaboration was made at the 2016 iADH conference. Educators in SCD from 20 different universities around the world volunteered to use the scales and to make the raw, anonymous data collected available to the iADH attitudes taskforce. Advice was given on validated methods of translation and cultural adaptation, and on the need for the assessment of reliability and validity of each translated scale. This process will allow field validation of the tools, but will also give insight into the attitudes of dental students internationally and the impact of teaching in SCD in many

varied contexts. ~~It is hoped that this initiative will lead to a progressively greater number of validated scales being added to the battery of tests made available through the iADH.~~

Acknowledgements

This work was instigated by the Education Committee of the International Association of Disability and Oral Health (www.iadh.org).

The following persons were involved in one or more stages of this project and their help is gratefully acknowledged:

Dr Dimitris Emmanouil, Dept Paediatric Dentistry, University of Athens, Greece

Dr Caroline Eschevins, EA4847 CROC, Université d'Auvergne, France

Dr Sue Greening, Aneurin Bevan University Health Board, Wales

Dr Susanne Krämer, Facultad de Odontologia, Universidad de Chile, Chile

Prof Gabriela Scagnet, National University of Buenos Aires, Argentina

Prof Shelagh Thompson, School of Dentistry, Liverpool University, England

Conflict of Interest Disclosure statement

The authors have nothing to disclose.

Ethical approval

The work described was carried out in accordance with the Declaration of Helsinki, including, but not limited to the anonymity of participants being guaranteed and the informed consent of participants being obtained. Ethical approval was accorded by the relevant authority in each pilot centre.

REFERENCES

- 1 Shakespeare T, Iezzoni LI, Groce NE. Disability and the training of health professionals. *Lancet*. 2009; 374: 1815-6.
- 2 National Disability Authority. Literature Review on Attitudes towards Disability. Dublin, Ireland. 2007. Available at: <http://nda.ie/nda-files/Literature-Review-of-International-Evidence-on-Attitudes-to-Disability-2007.pdf> (accessed 26/08/2016)
- 3 Faulks D, Freedman L, Thompson S, Sagheri D, Dougall A. The value of education in special care dentistry as a means of reducing inequalities in oral health. *Eur J Dent Educ*. 2012; 16: 195-201.
- 4 World Health Organisation. World Report on Disability, Chapter 9 The way forward: recommendations. 2011. Geneva, Switzerland. Available at: http://www.who.int/disabilities/world_report/2011/en/ (accessed 26/08/2016).
- 5 Mencap. Death by indifference: 74 deaths and counting. A progress report 5 years on. London, UK: Mencap. Feb 2012.
- 6 Michael J. Healthcare for all. Report of the independent inquiry into access to healthcare for people with learning disabilities. London; UK Department of Health. July 2008. Available at http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_106126.pdf (accessed 26/08/2016).
- 7 Rohra AK, Piskorowski WA, Inglehart M. Community-based dental education and dentists' attitudes and behaviour concerning patients from underserved populations. *J Dent Educ* 2014; 78:119-130.
- 8 Mohebbi SZ, Chinipardaz Z, Batebi A. Effectiveness of training senior dental students on oral health care for disabled patients. *Eur J Dent Educ* 2014; 18: 214-221.
- 9 Vainio L, Krause M, Inglehart M. Patients with Special Needs: Dental students' educational experiences, attitudes, and behaviour. *J Dent Educ* 2011; 75: 13-22.
- 10 Krause M, Vainio L, Zwetchkenbaum S, Inglehart MR. Dental education about patients with special needs: a survey of US and Canadian dental schools. *J Dent Educ*. 2010; 74: 1179-89.
- 11 Satchidanand N, Gunukula S, Lam WY, Mcguigan D, New I, Symons A, Withian-Leitch M, Akl E. Attitudes of healthcare students and professionals toward patients with physical disability: a systematic review. *Am J Phys Med Rehabil*. 2012; 91: 533-545.
- 12 Ryan T, Scior K. Medical students' attitudes towards people with intellectual disabilities: a literature review. *Res Dev Disabil*. 2014; 35: 2316-2328.
- 13 iADH International Association of Disability and Oral Health. Undergraduate Curriculum in Special Care Dentistry. 2012. Available at: <http://iadh.org/groups/education/curricula/> (accessed 26/08/2016).
- 14 Dougall A, Pani SC, Thompson S, Faulks D, Romer M, Nunn J. Developing an undergraduate curriculum in Special Care Dentistry - by consensus. *Eur J Dent Educ*. 2013; 17: 46-56.
- 15 Dougall A, Thompson SA, Faulks D, Ting G, Nunn JH. Guidance for the core content of a Curriculum in Special Care Dentistry at the undergraduate level. *Eur J Dent Educ*. 2014; 18: 39-43.
- 16 Cowpe J, Plasschaert A, Harzer W, Vinkka-Puhakka H, Walmsley AD. Profile and competences for the graduating European dentist – update 2009. *Eur J Dent Educ*. 2010; 14: 193-202.
- 17 Rogers W, Ballantyne A. Towards a practical definition of professional behaviour. *J Med Ethics*. 2010; 36: 250-254.
- 18 Azjen I. The theory of planned behaviour. *Organizational Behavior and Human Decision Processes* 1991; 50: 179-211. Available at: <http://dx.doi.org/10.1016%2F0749-5978%2891%2990020-T> (accessed 20/08/2015).

- 19 Godin G, Kok G. The theory of planned behaviour: a review of its applications to health-related behaviours. *Am J Health Promot.* 1996; 11: 87-98.
- 20 Dumitrescu AL, Wagle M, Dogaru BC, Manolescu B. Modeling the theory of planned behavior for intention to improve oral health behaviors: the impact of attitudes, knowledge, and current behavior. *J Oral Sci.* 2011; 53: 369-77.
- 21 Whitely P. Essex Centre for the Study of Integrity. Take the Integrity test. 2011. Available at: <http://www.essex.ac.uk/government/documents/integrity-test.pdf> (accessed 26/08/2016)
- 22 Chmar JE, Harlow AH, Weaver RG et al. Annual ADEA survey of dental school seniors, 2006 graduating class. *J Dent Educ.* 2007; 71: 1228-53.
- 23 Carreon D, Davidson P, Andersen R, Nakazono T. Altruism in dental students. *J Health Care Poor Underserved.* 2011; 22: 56-70.
- 24 Chadd EH, Pangilinan PH. Disability attitudes in health care: a new scale instrument. *Am J Phys Med Rehabil.* 2011; 90: 47-54.
- 25 Francis JJ, Eccles MP, Johnston M, Wlaker A, Grishaw J, Foy R, Kaner EFS, Smith L, Bonetti D. Constructing questionnaires based on the theory of planned behaviour; A manual for health services researchers. University of Newcastle 2004 ISBN 0-9540161-5-7. Available at <http://core.ac.uk/download/pdf/9559500.pdf> (accessed 26/08/2016).
- 26 Chen DCR, Pahilan ME, Orlander JD. Comparing a self-administered measure of empathy with observed behaviour among medical students. *J Gen Intern Med* 2009; 25: 200-2.
- 27 Lancaster GA, Dodd S & Williamson PR Design and analysis of pilot studies: recommendations for good practice. *J Eval Clin Pract.* 2004; 10: 307–312.
- 28 Brands WG, Bronkhorst EM, Welie JV. The chasm between knowing and choosing the ethical course of action. A survey of dental students in the Netherlands. *Int Dent J.* 2010; 60: 321-8.
- 29 Brown G, Manogue M Rohlin M. Assessing attitudes in dental education: is it worthwhile? *Br Dent J.* 2002; 193: 703-707.